



FEDERAL HEATH

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Please visit www.federalheath.com for more information including a complete listing of our nationwide sales offices or call 1.800.527.9495.

Lighting The Way For Our Customers Since 1901

NEON

or

LEDs

Which Lighting Application Is Best For Your Business?



Liquid Fire

- Georges Claude sold the first neon gas signs in the United States to a Los Angeles Packard dealership in 1923
- Gives off 360 degrees of light
- Fully bright in all directions
- Preferred choice for bright whites & bold colors
- Competitively priced and widely available
- Visible in day and at night
- Can be used in all temperatures
- Can be used on both plex and open face signs
- Neon signs can last many years, and usually need only minor maintenance
- Design is almost unlimited
- Neon is considered an art form
- Our founding fathers held the first and original patent for neon/cold cathode in the United States



Liquid Light Bulbs

- Small, electric components that emit light when a current is passed through them. The first LED effects were noticed in 1907
- Emit specific wavelength of light that can match the color of the sign face material
- Brighter luminescence & a longer lifespan
- Reduced voltage requirements & power savings
- Use 10% energy consumption of traditional lightbulbs, and last 30 times longer
- Images can change due to increasingly complex patterns
- LEDs are used in plex faces, border tube lighting, sign cabinets and more
- Easy troubleshooting, can reach within the sign
- Allow illumination in small 2-3" channel letters
- Can be used in all temperatures
- Colors include: red, blue, green, cyan, & amber

Making a LED Sign

Perhaps the first person to notice the future effects of light emitting diodes (LEDs) was Englishman H. J. Round in 1907. Round, employed by Marconi Labs, was researching radio waves when he first noticed that parts of the crystal silicon carbide he was working with started to glow. However, the first visible LED was developed by GE researcher Nick Holonyak, who is considered the "father" of the LED.



LEDs became available in the late 1960s and were used in home appliances such as radios, telephones and televisions. The only color available was red. They were not powerful enough to illuminate. LED technology continued to advance, with the development of gallium aluminum arsenide, which enabled the LEDs to deliver a ten-fold increase in brightness, using a lower voltage. LEDs started to be used in bar code scanners, medical equipment and fiber optic data transmission systems. Color choices increased to green, yellow and orange in addition to red.



- Cathode + Anode

By 1993, researchers using a transparent contact made of indium tin oxide developed the first white LED. Today, LEDs can be used just about any place that requires a light source. Future possibilities are endless as the quest continues for even more powerful, long lasting and low energy consuming LED products.

Thin metal wires connect one side of the circuit to a small piece of semi-conductive material on the other side. The LEDs two leads are cut to different sizes to show how they are connected; the longer piece is the positive anode; the shorter piece is the negative cathode.

Making a Neon Sign

Hollow glass tubes used to make neon lamps come in 4, 5 and 8 ft. lengths. To shape the tubes, the glass is heated up by lit gas and forced air. To get the desired length, the glass tubes are scored with a file (partial cut) while cold and then snapped apart. Several different compositions of glass are used; "soft" glass includes lead, soda-lime and lead glass, "hard" glass comes from the borosilicate family. Depending on the glass composition, the working range of glass is from 1600 degrees F to over 2200 degrees F. The temperature of the air-gas flame, depending on the fuel and ratio, is approximately 3000 degrees F using propane gas.

The neon artisan creates the angle and curve combinations. Formed tubes go through another process called bombarding in the US. The tube is partially evacuated of air. Next, it is short circuited with high voltage current until the tube reaches a temperature of 550 degrees F. Then the tube is evacuated again until it reaches a vacuum of 10-3 torr (1 Torr = approx. 1mmHg). Depending on the desired color neon, argon or neon gas is back filled to a specific pressure and then sealed off.

Neon gas is red and glows with its characteristic red light even at atmospheric pressure. All glass tubes are a derivative of either red or blue (argon) gas. There are currently over 150 colors available, including many pastel colors, which are achieved by different phosphorous coatings on the glass. New high-output phosphor colors are increasing lumen brightness by up to 50%. Long recognized as an efficient lighting source, neon is also benefitting from recent technological advances, such as transformers that are more efficient and have built-in secondary-circuit ground-fault protection.

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